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LEPROSY NUMBER

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OUR NEW DIRECTOR

Dr. (Srimathi) H. M. SHARMA,
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WELCOME

WE extend a hearty welcome to the new Director of Public Health, Dr. (Srimathi) H. M. Sharma who had succeeded Dr. N. Parthasarathy and assumed charge on 14-3-1963.

The outstanding contribution of Dr. (Srimathi) H.M. Sharma as Assistant Director of Public Health in charge of Maternity and Child Welfare is too well known to need repetition. She had been to United States of America on Travel Fellowship of the Rockfeller Foundation. She has also worked as the Professor of Social and Preventive Medicine in Madras & Stanley Medical Colleges.

We hope under her able guidance, the Public Health Department will make rapid strides in the execution of Health Schemes in the State.

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FOR YOUR INFORMATION

Due to National Emergency we will be publishing this as a quarterly journal instead of monthly one. We request you to contribute and extend the same support as was done previously. Comments and criticisms from you are always welcome to improve the Journal as well to sustain it.

The title of the Journal has been changed to Madras Health Education.

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Present set up of Leprosy Work in Madras State

By

Dr. EKAMBARAM
State Leprosy Officer

Madras State though highly endemic for Leprosy is also lucky to have quite a large Number of Governmet and Voluntary Organisations engaged in Leprosy Relief Work. The incidence in our State ranges from a minimum of 1% to a maximum of even 8%. The Districts of South Arcot, North Arcot, Chingleput and Salem have the highest incidence i.e. more than 3%.

Trichy, Maduri, Ramanathapuram and Tanjore Districts are moderately endemic having about 1% to 2% endemicity for leprosy.

Kanyakumari, Coimbatore and Tirunelveli Districts are in general lowly endemic but it must be remembered that even in these Districts there are pockets of heavy incidence which deserve concentrated relief measures to check the spread of the disease to other areas in these Districts.

The Nilgiris District, fortunately is reported as almost free of the disease though there may be a few immigrant patients from the neighbouring endemic areas.

So it is evident that our Leprosy problem is really stupendous and so requires careful planning, efficient organisation, co-operated and co-ordinated efforts between the Voluntary and Government Organizations and above all a willing band of workers for this work.

Modern concept of Leprosy Control Work

It would be useful at this stage to consider the methods we are adopting to check the spread of the Disease.

The old idea of segregation of patients in colonies called aptly (in olden days) Settlements are now given up, because it is neither practical nor feasible for financial and other reasons, to segregate the large number of patients in under-developed but highly endemic countries like ours.

So, as a practical and a possible method, we now plan Leprosy Control Work on the 3 cardinal principles:

i. **Decentralised treatment:** (so that treatment is taken to the villages.)

ii. **Intensive Survey:** (to have an accurate idea of the prevalence of the disease and also to study any subsidiary factors that have to dealth with in the control of the disease).

iii. **Health Education:** (to educate the Public about the true nature of the disease with special emphasis about steps to be taken to prevent the spread of the disease.

iv. **Rehabilitation:** (to help disabled patients to earn their living by suitable occupations instead of they becoming a burden on Society).

These are the Principles on which all the Control Units are working in our State. I may add that though the present method may not be completely perfect, yet this is the best yet available method of controlling the spread of the disease.

Present facilities available for Leprosy Relief in our State.

I have to first mention that our State has the unique advantage of many Voluntary Organisations doing Yeoman Service in this sphere and also co-ordinating with the Governmental Organisations in their efforts to check the spread of the disease.

Types of Units now working in the State.

There are three kinds of Units now working in the State i.e. The Leprosorium, started long ago, The Control Units, and the

Wallajah Scheme. I have also to state that though segregation is not generally advocated now as a method of control yet they have still a very useful role to play. A few of these Institutions are doing useful work i.e. Research into the various unsolved aspects of the disease, the Christian Medical College and Hospital, Vellore and the Central Leprosy Teaching and Research Institute, Tirumani being the examples of such Institutions. We cannot forget the pioneering work done by the Christian Medical College and Hospital, Vellore in this respect i.e. the introduction of Reconstructive Surgery and Physiotherepeutic measures in Leprosy. A few Leprosoriums are also doinq useful control work in addition to their colony work e.g. Kasturba Gandhi Kushta Nivaran Nilayam, Mazhavanthangal.

The Control Units both Government and Voluntary work on the principles of Leprosy Control are already enunciated i.e. Treatment, Survey, Health Education and Rehabilitation but the last part of the work is yet to be fully developed.

The Wallajah Scheme needs special mention as our State has again started a new Scheme of Leprosy Control Relief in this country. The special feature of the Scheme is that General Duty Medical Officers, in addition to their duties, work also the Leprosy relief Scheme in their respective areas. It is well to remember, at this juncture, that though the Scheme is the ideal and the only practical method of ultimately tackling the disease in an endemic country like ours, the success of the Scheme depends entirely on the willingness and sincereity of all the Workers of the Scheme. I would like to emphasize even to the point of repetition that it is not enough if the Director of such a Scheme alone is enthusiastic but all the participants in the Scheme should have an equal enthusiasm for the work.

Institutions now working in the State.

GOVERNMENT :—

There are 14 Control Units now working in the State distributed throughout the State except in Nilgiris District.

There are even 3 Units in certain endemic Districts as seen from the list below:

District.	No. of Units.	Place, where situated.	
1. Chingleput	1	Govt. Leprosy Subsidiary Centre,	Trivellore.
2. North Arcot	2	do.	Tiruvettipuram.
		do.	Tiruvannamalai.
3. South Arcot	3	Govt. Leprosy Treatment & Study Centre,	Tirukoilur.
		Govt. Leprosy Subsidiary Centre	Vridhachalam.
		do.	Veeraperumanallur.
4. Tiruchirapalli	1	do.	Perambalur.
5. Tanjore	1	do.	Orathanad
6. Tirunelveli	1	do.	Paramankurichy.
7. Kanyakumari	1	do.	Thuckalay.
8. Coimbatore	1	do.	Kodumudi.
9. Madurai	1	do.	Sembatti.
10. Salem	1	do.	Attur.
11. Ramanathapuram	1	do.	Aruppukottai.
	14		

In addition to the above Units, 5 more bigger Units have already been sanctioned and are now being organised at the following places :—

Chingleput	...	Kanchipuram
South Arcot	...	Kallakurichi
North Arcot	...	Elathur
Madurai	...	Palni
Salem	...	Namakkal

In addition there are following Voluntary Organisation engaged in Control Work in the State :

1. Chingleput ... 1. Belgian Leprosy Centre, Polambakkam.

		2.	Deenabandu Medical Mission R. K. Pet.
		3.	Hind Kusht Nivaran Sangh, Kanchipuram.
		4.	Church of South India Leprosy Centre, Madrapakkam.
2.	North Arcot	... 1.	German Leprosy Centre, Chetput.
		2.	C. S. I. Leprosy Centre, Wandiwash.
		3.	The Swedish Mission Hospital, Gudiyatham.
3.	South Arcot	... 1.	Thakkar Baba Kushta Nivaran Sangh, Tirukoilur.
		2.	Kasturba Gandhi Kushta Nivaran Nilayam, Mozhavanthangal.
		3.	Jothy Nilayam Rural Centre, Muttathur.
		4.	St. Anthony's Centre, Rawthakuppam.
4.	Tanjore	... 1.	Hind Kusht Nivaran Sangh, Kumbakonam.
		2.	Sacred Heart Leprosy Hospital, Sakkottai.
5	Salem	... 1.	St. Mary's Hospital, Arisipalayam, Salem.
		2.	Leprosy Relief Rural Centre, Settipatty.
6.	Tiruchirapalli	... 1.	Hind Kusht Nivaran Sangh, Tiruchirapalli Dist. Branch.
7.	Tirunelveli	... 1.	St. Joseph's Leprosy Home, Tuticorin.

8. Ramanathapuram ... 1. Dayapuram Hospital and Home for Lepers, Manamadurai.
2. S. P. G. Mission Hospital, Kilanjunai

Besides the above, there is the Wallajah Scheme at Ranipet covering the entire Wallajahpet Taluk in North Arcot Dist.

Statistics of the work done now (Up to June '62).

It would be revealing to know the Number of patients treated at all the various Centres (Government and Voluntary) in the State with other particulars i.e. Patients detected by Survey etc.

1.	No. of Govt. and Non-Official Control Units ...	20
2.	No. of patients detected by survey ...	34,940
3.	Total No. of Known cases in areas served by the existing Leprosy Institutions ...	59,606
4.	Actual No. of patients registered for treatment at all the Leprosy Institutions ...	45,123
5	Total No. of patients treated at all the Leprosy and General Medical Institutions (approximate) ...	1,50,000
6.	Total No of Leprosoria in the State (Government and Voluntary Organizations) ...	10
7.	Total No. of beds available in all the Sanatoria ...	3,000

The Lacunae in our present coverage.

The following areas in the various Districts mentioned below need to be covered by Leprosy Relief Units :—

1. South Arcot ... Chidambaram
... Gingee
... Tindivanam
... Villupuram
... Valavanur

2.	North Arcot	...	Arni
		...	Arkonam
		...	Chengam
		...	Tirupathur
3.	Chingleput	...	Sriperumpudur
4.	Ramanathapuram	...	Virudhunagar
		...	Chettinad
		...	Tirupputtur
5.	Thanjavur	...	Mannargudi
		...	Pattukottai
		...	Sirkali
6.	Tiruchirapalli	...	Kulithalai
		...	Lalgudi
		...	Musiri
		...	Srirangam
		...	Karur
		...	Udyarpalayam
7.	Coimbatore	...	Erode
		...	Gobichettipalayam
		...	Kangayam
8.	Salem	...	Rasipuram
		...	Dharmapuri
		...	Thiruchengode
		...	Salem
9.	Tirunelveli	...	Nazerath
10.	Madurai	...	Periakulam
		...	Nilakottai

Our Future Plans for filling the Lacunae mentioned above.

We have plans for filling up the lacunse mentioned above as follows :

Plans for opening Leprosy Control Units at:

1.	Palni	... Madurai District	Being organised to start work
2.	Kanchipuram	... Chingleput District	
3.	Kallakurichi	... South Arcot District	
4.	Elathur	... North Arcot District	
5.	Namakkal	... Salem District	
6.	Krishnagiri	... Salem District	
7.	Sivagiri	... Tirunelveli District	

The Units to be organised in these 7 places are bigger than the present Leprosy Subsidiary Centres, as they will cover a population of 1½ lakhs. Also they will be fully staffed to do Physiotherapy and Laboratory work.

In addition to the above 7 Leprosy Control Units, smaller Units called S.E.T. Units consisting of one Para Medical worker will be attached to General Medical Institutions in places where the incidence is not high. These S.E.T. Units will be opened in 128 places in our State. First 28 S.E.T. Units are proposed to be opened in the places mentioned in the Column "The Lacunae in our present coverage."

Personnel for Leprosy work.

The expanding scheme of our Leprosy work requires more and more personnel for which training centres are essential. At present, there is only one Training Centre at Tirukoilur ; but as this Centre has now only 23 candidates under training. It is proposed to take up in the near future 60 candidates for training. Even then, the number of personnel needed for manning our new Units both Government and Voluntary is too large to be supplied by one Training Centre. So, proposals for the starting of Training Centres in certain Voluntary Organisations are also under consideration. I have to add that Training Centres have a very important place in any Scheme of work which is expanding.

Role of the General Duty Medical Officers in Leprosy work

Though we have a large amount of Anti-Leprosy work being done both by Government and Voluntary Organisations, still it will not be possible to cover the entire State only by these Units. Hence, the General Medical Institutions will have to help in affording Leprosy relief in their own areas. It will be well nigh impossible to tackle the problem purely by the full-time Institutions without the help of General Duty Medical Officers. Hence, all the General Medical Institutions also will be enlisted to help in the work.

Health Education and Rehabilitation

As regards Health Education and Rehabilitation, the former needs to be increased many-fold and the later yet to be organised. Health education is now being done by homely talks by the personnel of the verious Leprosy Centres and Film Shows with explanatory lectures are being given at various places in the State due to the efforts of Sri T. N. Jagadisan, Honorary Secretary of the Hind Kusht Nivaran Sangh, Madras State Branch. But I have to add that much more has to be done to spread Health Education about Leprosy to the masses.

In this connection, we have to bear-in-mind, that as many of the educated citizens also are ignorant about the true nature of the disease, health education in Urban Areas is an urgent necessity. I have to stress that more literature written in a simple style in the regional languages have to be produced to be distributed to the public. A few more films about Leprosy have also to be produced as the present only available Film is too old.

Rehabilitation is a specialised venture and needs the co-operation of the Doctor, the Physiotherapist and also Occupational Therapists There are proposals to start Rehabilitation Centres in a few Government Centres e.g. at Tirukoilur as well as in Voluntary Organization e.g. Polambakkam, Christian Medical College, Vellore and St. Joseph's Leprosy Home, Tuticorin. This difficult Problem of rehabilitating Leprosy patients needs to be solved by

opening Rehabilitation Centres in a Regional basis in the State for which proposals are already under consideration.

Conclusion

The Leprosy Problem in our State is collosal but our resources for tackling the same are also large and yet we have to remember that we have to still expand our work. But I am hopeful that our Government and Voluntary Organizations will rise to the occation and achieve the object. Health education measures need to be increased many-fold so that the educated and the uneducated are alike educated about Leprosy.

More and more personnel are needed for our expanding Schemes and so more Training Centres need to be started We have to enlist the active co-operation of the General Duty Medical Officers to help in this gigantic task and so an ernest beginning should be made now itself so as to ultimately achieve the object of integration of Leprosy Relief with General Medicol work. Above all, willing workers are needed for this difficult task.

I am sure that with the kind guidance of our Health Minister, able direction of our Director of Medical Services and the sincere efforts of our Workers, we can achieve our Object of controlling the spread of the disease to a great extent before the end of the Third Five Year Plan.

Nation Needs you ....

HELP THE NATION IN EMERGENCY

AS A STRETCHER BEARER

AND HELP THE SICK

TO PLACES SAFER.

Leprosy, its epidemiology diagnosis and control

By

L. M. BHATTACHARJI,

Professor of Epidemiology

All India Institute of Hygiene & Public Health, Calcutta.

Leprosy is a chronic infectious disease of very great antiquity known to be prevalent in India since very ancient times. People, since the beginning of human civilization, has always looked upon this disease as infectious and incurable and has treated lepers with utmost horror and abhorrence

This concept of infectivity and incurability regarding the disease has as a consequence, led in Europe, in the middle ages to the adoption on the part of society, of certain very inhuman and cruel measures against the unfortunate victims of this disease, with the result that lepers were either burnt alive or socially segregated. In fact, because of the ugly and mutilating lesions usually associated with the disease, leprosy has been held in the public mind as something very repulsive, so much so that sick persons even when cured, have continued to carry with them the stigma of a leper and have found in extremely difficult to resume their normal lives in society. Such social stigma, neglect and fear attached to the disease has turned many a poor victim to utter destitution and fraustration and has even gone to the extent of creating the class known as "professional lepers."

It is in the fitness of things therefore, that on the occasion on the 16th death anniversary of the Father of the Nation, the authorities of the Journal of Health Education, Madras, should think it proper to bring out a special Leprosy number of their journal, in memory of one who always looked upon the cause of these down trodden people, as his very own. We, who been

asked to contribute articles on this occasion feel proud to be associated with this venture and in that same spirit of service and humanity this article has been contributed.

Epidemiology:

There are about 12 million cases of leprosy in the world of which over 2 millions occur in India alone. In India, the disease is highly prevalent in West Bengal, Orissa and Madras and parts of Bihar and Andhra, than in other states. In these states nearly as high as 5 to 20% of the population in particular villages may be afflicted with the disease. Of the total 2 million cases in this country, nearly a quarter or 5 lakhs are suffering from lepromatous or infectious type of the disease, which constitutes the main sources from which healthy people get infected, while the rest 1.5 millions are non-lepromatous or border line cases which are generally closed or non-infectious in character.

In the light of modern day evidence, leprosy is now known to be contagious, but the degree of its communicability is considered to be of a much lower order than that of either tuberculosis or syphilis. It is also now known that the disease is never hereditary; contagion is thought to be postnatal and congenital infection is quite exceptional. Infection, it is now believed, takes place only as a result of a daily and often intimate contact with an open or infectious case of the disease, either at home or at work. The risk of contracting the disease, when such contact takes place within the home and family, is much greater than when it is during work or travel. Inspite of this knowledge on the transmissibility of the disease, the exact mode of infection in leprosy and the point of entry of the lepra bacilli into the human body has not yet been fully established, although recent work carried out in this country seems to suggest that infection probably may take place through the skin from where the bacilli are subsequently carried to the nerves and glands where they lie dorment for many years.

Mycobacterium leprae though discovered as early as 1870, as the causative agent of this disease, has still eluded being cultivated and grown artificially outside the human body and

this has been a great handicap in the experimental studies on the disease. Leprosy is a disease of man alone, although a related disease known as a Rat leprosy, is known to occur in rats. But, the rat leprosy bacillus or infected materials from such murine cases are not inoculable to man, just as the human infection cannot be reproduced in the rat or any other experimental animal

The human disease attacks all ages and both sexes, but are more common among children between 2 to 14 years. Young children below 5 years of age, if exposed are specially predisposed in this respect and as such, require the highest *priority in all prophylactic and control programmes.* Similarly for reasons unknown, there is a greater preponderance of cases among the males than in the females belonging to the same age group as the former. However, the factor of prime importance in the spread of this disease is the presence in sufficient numbers, in society, of open or bacteriologically positive cases and the opportunities of contact, that children or other people, have with these sources of infection. Apart from contact, there is no proved evidence yet; that leprosy can be communicated by any other way, viz., through water, food, flies or bites of insects. Under similar conditions of exposure, European and *Mongalian races have lesser tolerance to the disease than* Indians or Africans. There is no adequate evidence that leprosy is due to any specific dietatic deficiencies but poor diet as in any other infectious disease lowers body resistance and makes the disease run a comparitively more severe course.

Clinical features:

The disease symptoms usually set in after an incubation or latent period which may be as long as 2 to 5 years, depending however upon the age of the person exposed and on the degree and intimacy of contact that he has under-gone with an open case. The onset of the disease may be gradual or sudden, but in India in most cases, the onset in very gradual and insidious.

The earliest sign is the appearance in the skin of *hypo or depigmented* patches, with accompanying loss

of cutaneous sensation. These skin patches may be either flat (macule) or raised in the form of a nodule (tubercle). Cutaneous nerves supplying the affected skin often becomes thickened and when palpated feel cord like. In less resistant persons, the lesions become more generalised from the beginning and the skin, particularly those on the face, ears, trunk and hands, become thickened. Nodules usually form on the face and ears, giving rise to the characteristic lion-like and other changes in features. Often the disease may start with symptoms of numbness, tingling, formication or insect bite and loss of sensation either in the hand, foot or face with subsequent development of paralysis, resulting in clawing of the hand, wrist or foot drop and paralysis of the eye lids. It may at time start with painless trophic ulcers in the sole beneath the base of the great toe. In many of these cases there may be no history or evidence of any skin lesion. With progress of the disease fingers and toes get ulcerated their bones absorbed and there takes place a gradual loss of these parts. Besides skin and nerves, leprous lesions may also appear in the eye, nose and larynx and as a result these organs get inflamed and ulcerated.

In a well established case, the three cardinal signs of the disease, viz., skin patch or patches, loss of sensation and the thickening of the nerve or peripheral nerve trunks supplying the affected skin are quite evident, but diagnosis of the disease in all cases should be made by competent leprologists, who thereby will not only be able to classify the type of the disease, but determine bacteriologically, whether the case is open or closed and recommend appropriate therapy control measures.

Control :

The control of Leprosy, which has received quite a high priority in this country in the successive five year plan periods, is based on the same basic principles as govern the control of any other communicable disease.

The fundamental purpose of such control campaigns is to make as early as possible, by adequate chemotherapy, an open case of the disease, non-infectious. By achieving this not only

the development of new cases are prevented but a progressive reduction in the endemicity of the disease also takes place. With the discovery during the last decade, of the value sulphone therapy in this disease, it has been possible now to achive, within one to two years from the time of instituting such therapy, clinical and bacteriological cure of the disease and as such the control of this disease has now entered the stage of a practical reality. A modern day leprosy control programme envisages work on the following lines.

(a) Regular treatment and follow up of cases:

All patients suffering from the disease should be registered with a clinic where they should be regularly and adequately treated with chemotherapy, with a view to reducing the reservoir of infection and the possibilities of the disease being transmitted through them. Regularity in treatment is one of the pre-requisites for attaining a quick clinical cure. The period of such treatment in leprosy may be from 6 months to 2 years, depending upon the clinical type and severity of the disease. Interruptions of treatment with chemotherapy may often aggravate the disease, which then becomes more resistant to therapy. Even where the disease has been cured or arrseted, possibility also exists of a future relapse, which may take place within as late as three years from the cessation of such treatment. It is on this account very necessary indeed to have a regular follow up. at three or six monthly intervals, of these cured or arrested cases, either by regular clinic or domicilliary visits. Various drugs have been used from time to time in the chemotherapy of leprosy, but none has proved such a success as the sulphones, which are highly potent in clearing the ocular, mucosal and cutaneous lesions, but unfortunately have little or no effect on the peripheral nerve lesions or paralysis, for which recourse has to be taken to physiotherapy or orthopaedic surgery. Since, drugs like the sulphones are somewhat toxic to the bone marrow and treatment of a case has to be given for quite a prolonged period, a periodic follow up and blood examinations become a necessity and watch is needed to be kept for possible development of psychosis and leprotic reactions

(b) Case finding and case detection :

A suitable case finding programme to detect as far as possible, all possible cases of the disease in an area and to get them when detected, adequately treated as early as possible, is another very important aspect of a leprosy control programme. New cases in the country can be detected by means of mass surveys carried out in the population or where they are not feasible, or practicable, specially vulnerable groups such as household contacts, school children, factory and industrial labour, military and police personnel beggars and vagrants may be examined. In addition to these surveys which generally should be organised through special leprosy clinics, epidemiological follow up of the household and work contacts of a recognised case is an essential part of a leprosy campaign.

(c) Protection of contacts :

It is well known that children are much more susceptible to the disease than adults and that the disease in children may often go unrecognised, but when detected and treated, a leper child can be cured and restored to complete health much more easily than an adult. It is for these reasons special attention in all leprosy control programmes has to be paid to the protection of all child contacts, either by separating them at birth from their leprous parents and other affected members of the family, or where this is not practicable, keeping them isolated in the home by all means from known or suspected cases, and putting them under a regular medical observation and surveillance for the whole period during which the infected person in the household the child is in contact with is being treated. Where home conditions do not permit such isolation, leprous patients if suffering from infectious type of the disease needs to be sent to hospitals or leprosaria, until such time as they become bacteriologically noninfectious Isolation of contact children to special homes known as preventoria, as was the practice in some countries like France, Spain, Mexico are not only not cheap, but attaches a stigma on the child and is not always possible to carry out. As a further means of protection, B.C.G. vaccine given either orally or intradermally, is now recommend.

ed as an additional measure of prophylaxis, in all lepromin negative children and other contacts in a leprous household. Similarly, preventive treatment of child contacts after the age of 15 years in these households, with prophylactic sulphones or D. D. S. given twice a week, in doses as small as 5 to 50 mgms. depending upon the age of the person, for the whole period of infectious contact, have given encouraging results and may be given a trial.

(d) Rehabilitation of cured or arrested cases:

Apart from clinical cure or arrest of the disease which follows intensive sulphone therapy, patients with deformities and contractures need to have recourse to surgical procedures and remedial excrecess. These would counteract to some extent his deformities and will enable him to pursue a useful life in society. Apart from such physical rehabilitation through physiotherapy and plastic or orthopaedic surgery, a leprosy patient needs mostly to be socially rehabilitated and this cannot be done unless proper health education is carried out among the people.

(e) Health Education:

This health education as mentioned above, should be aimed at the general public, to remove their age-old prejudice and stigma against the disease. It should also include education and training of doctors, health personnel and patients. The public has to be told that leprosy is just like any other communicable disease, acquired through contact with an infectious case of the disease. With the means of treatment available to-day, the disease is no longer incurable and that when detected and treated early, much of the deformity and horror of the disease can be avoided. Efforts should also be made to convince people that arrested cases with deformities are noninfectious and do not transmit infections and are therefore not dangerous for others. What however is most demanded of the people is that society should adopt a more rational attitude to the ancient disease and treat lepers in the society in a more human way and follow the example that Mahatma Gandhi has led before us.

Central Leprosy Teaching and Research Institute, Chingleput.

INVESTIGATION IN THE TREATMENT OF LEPROSY.

Through the checkered history of this Institution ever since the time when it came into being in the year 1924, its main activity apart from the isolation and segregation of patients was therapeutic investigation of drugs known to be useful in leprosy.

Hydnocarpus oil was used in its various forms in varying doses, and at one time a patient was receiving doses of nearly 30 c.c. of Hydnocarpus Oil both intradermally and intramuscularly, twice a week. In this extensive investigation carried out over many years, it was found that in this Institution a patient suffering from early macular or diffuse lapromatous leprosy was rendered non-infectious and symptom free after an average period of 3½ to 4 years. But because of its cumbersome mode of administration and painfulness of the injections and especially of the extensive relapse rate after stoppage of treatment, the workers in this field were in search of better and more effective drugs.

About the year 1940 when sulphone and its substituted compounds were proclaimed as wonder drugs in the treatment of leprosy, it was felt that we have at last obtained a specific treatment for this disease, because of the limitations of hydnocarpus therapy. Large number of cases in this Institution were subjected to medication with sulphones both by the oral route and by injections. At first the substituted compounds of sulphones were used such as Sulphetrone, Diasone, Promin, Promacetin, Sulphone Cilag and a few other similar derivatives, and later the basic sulphone itself was used by the injection route as oral medication in the approved therapeutic doses was found to be too toxic.

With sulphones also the length of treatment of an early lepromatous case was as long as 3 to 4 years. Concurrently extensive investigations were undertaken to determine whether sulphone by injections had a better effect in maintaining blood levels; and the results did show that sulphone blood levels were maintained for a longer period than when given by the oral route. Histopathological examination of skin biopsies were undertaken to obtain some knowledge of what might be happening to the tissues during the period of treatment and after. But though the sulphones did not prove to be that wonder drug, nevertheless it still holds the field in the treatment of leprosy.

Other drugs such as Thiosemicarbasone, Isonicotinic, Acid Hydrazide, Para-amino salicylic acid and Streptomycin were given a fair trial to investigate their usefulness in the treatment of leprosy, because of their proved efficacy of tuberculosis. But none have stood the test of trials.

In the field of Ayurveda the bitters such as Nimba and Kadira were also tried with little result.

Another investigation which was undertaken was B.C.G. vaccination of leprosy cases in the Sanatorium with a view to reverse their lepromin reaction especially in the anergic lepromatous types and thereby to note if any therapeutic betterment could be obtained. Apart from the fact that a small percentage of these cases did show a reversal of the lepromin reaction, it was found that this reversal was but temporary and no change in the pattern or course of the disease was worth mentioning.

Again in recent years S. U. 1906 (DPT) and Etisul were put on extensive trials because of claims made by certain workers of their effectiveness in the treatment of leprosy. Here again in this Institution these drugs have failed to equal or surpass Diamino diphenyl sulphone (D.D.S.) in its specific effect in the treatment of leprosy.

RESEARCH ACTIVITIES.

(a) **Therapeutic** :—It has been aptly said that the sea of leprosy is strewn with wrecks of new cures. Any new drug offered as a cure for leprosy was often received over-enthusiastically and sometimes exaggerated claims were made on its efficacy. Perhaps based on flimsy or inadequate or none-too-satisfactory planned clinical trials. First the derivatives of D.D.S. and then the parent sulphone drug itself came to occupy a very prominent place in the therapy of leprosy. Certain non-sulphone drugs found effective in tuberculosis were passed on for trial in the sister mycobacterial disease, leprosy.

The parent sulphone has stood the test of time and has come to stay as the drug of choice, capable of wide application because of its easy availability, low toxicity effectiveness and negligible cost. However, the constant search for a more potent and more rapidly effective anti-leprosy drug is going on.

At the Institute thereapeutic investigaticn of the following seven new drugs including 3 indigenous remedies were conducted :—

(i) Acetyl Laderkyn, a long acting sulphonomide given parenterally.

(ii) ETISUL, a thiol compound with the characteristic pungent smell of garlic which when applied as an injunction has a systemic effect, causing a fine fragmentation and diminution of lepera bacilli in the skin ;

(iii) Tapazole brand of Methimazole, an anti thyroid substance accidentally discovered to be effective in leprosy also ;

(iv) Tebafen, an anti tuberculosis agent ;

(v) Dr. Phalak's indigenous remedy ;

(vi) Raj Vaidya Mishra's mercury preparation and

(vii) Dr. Karamuse's Sanjeevini (Mehandi Seeds).

These trials have since been discontinued because the results of the pilot study lasting over 6 months have not been encouraging.

(b) **Clinical :—**

(i) The study of the maculo-anesthetic, Borderline and Indeterminate lesions from the clinical, bacteriological, immunological and histopathological aspects is under way.

The object of study of the maculo-anesthetic type of leprosy is to establish its specific clinical entity by appropriate documentation.

(ii) Another study is with reference to reaction in Tuberculosis leprosy – termed by some workers as Tuberculoid Reaction and Reactional Tuberculoid state. The object of the study is to justify or otherwise this division based on their clinical, bacteriological, immunological and histopathological characteristics. A follow up of these types of reactions is also planned with a view to study their further evolution.

(iii) **Study of lepra Reaction and its treatment :—**

A detailed study of lepra reaction, i.e., the condition of acute exacerbation that supervenes in the course of lepromatous leprosy, has been under progress from the clinical, bacteriological, immunological, histopathological and therapeutic point of view. With the establishment of a Biochemical Laboratory in the Institute, it is proposed to carry out certain biochemical studies which may throw light on the aetiological factors precipitating this condition.

As a treatment for this condition two drugs are on trial (a) the time-honoured Potassium Antimony Tartarate injection intravenously and (b) Camaquin, an anti-malarial administered orally. The response to these two different methods of treatment is being studied with a view to assess their efficacy.

(iv) **The treatment of leprous neuritis :—**

Leprous neuritis occuring independently or as a component of lepra reaction or in the course of non-lepromatous leprosy is

a distressing complication which may sometimes lead to incapacitating deformities and disabilities. Methods aiming at rapid amelioration of the symptoms and obtaining lasting relief have been practiced from time to time with varying success. Intraneural injection of a mixture of hydrocortisone, hyalase and novocaine has been tried here with beneficial results.

Recently certain preparations made from garlic (syrup and powder containing the non-activated active principles of garlic cloves) reported to be beneficial in cases of neuritis is being tried in this connection. This latter method of therapy has been found useful in cases of mild neuritis only.

(c) D D. S. Prophylaxis study.

(i) A detailed study to assess the value of D. D. S. as a prophylactic drug against leprosy in child contacts of leprosy cases is being conducted in Saidpet, a suburb of Madras City since 1958 The details of the experiment are as follows:— Intrafamilial (mostly) and some extrafamilial child contacts of both lepromatous and non-lepromatous cases were divided into two comparable groups ; one group of contacts was administered DDS orally as a prophylaxis against leprosy while the other group used as control was given Calcium lactate tablets as 'placebo'. Periodical examination or these child contacts has been done systematically with a view to detect the development of any lesion of leprosy.

A three and one-half year review of this investigation indicates that D. D. S. does not appear to be an effectvie chemoprophylactic drug against leprosy. New cases of leprosy, almost of equal number arose both in the prophylaxis and control group of children.

(ii) Although the results of the above experiment did not serve to establish the usefulness or otherwise of D.D.S. as a chemoprophylactic drug, in view of the tremendous importance and significance of the investigation an extended study has been launched in an area near the Institute.

An area of about 300 sq. miles in Chingleput Taluk with a population of about 200,000 has been selected for this detailed DDS prophylaxis Study. The prevalence of leprosy in a part of this area in a previous Sample Survey was about 2% with a lepromatous rate of 20%. 20 trained para-medicals are engaged in the General Survey (which is now nearing completion) that is necessary before starting the actual study. The object is to select about 700 child contacts, allocate them in two identical groups *(according to Statistical norms)* give one group half the therapeutic doses of D.D.S. and the other half a placebo (calcium lactate), and observe children of both groups at fixed intervals for signs of leprosy. This study is to last 5 to 7 years before results are assessed.

COURTESY :—Central Leprosy Teaching and Research Institute, CHINGLEPUT

News Bulletin, Volume I, December, 1962.

OUR DEFENCE EFFORTS NEED STRONG AND HEALTHY PEOPLE. PREVENT DISEASE BY TAKING WATER FROM SAFE SOURCE.

Leprosy—Some Facts and Figures

Sri. T. N. JAGADISAN,

Hon. Secy., " Hind Kusht Nivaran Sang " Madras State Branch.

HERE ARE SOME FIGURES.

Statistics pertaining to leprosy in India are incomplete. The following estimates are shrewd guesses supported by the evidence of sample surveys.

1. There are some three million cases of leprosy in India. Of these some 8,00,000 are in Madras State.

2. About 80% of leprosy patients belong to the non-infective type.

3. There are probably some 15 million cases of leprosy in the world. Africa, India, China and Korea have the highest incidence. There are large foci of leprosy in South American countries like Brazil, Argentina and Columbia. Some 70 countries have leprosy.

THESE ARE THE FACTS.

Though medical science has yet to discover a lot about leprosy, enough is known to revolutionize popular ideas on the subject and to transform the prevalent attitude towards the disease. The following statements are based on established scientific data.

1. LEPROSY IS NOT HEREDITARY. It may run in families, owing to close and prolonged contact of healthy persons (especially children) with an infective case in the house.

2 IT IS NOT VENEREAL IN ORIGIN: *It is also quite* different from leucoderma, which is a discoloration.

3. ABOUT 75% OF LEPROSY CASES ARE NON-INFECTIVE. *These patients should therefore be free to pursue* their normal lives and vocations. Though non-infective, they may need treatment.

4. THE INFECTIVE POWER OF LEPROSY IS LOW. The vast majority of adults are not susceptible to infection even though they come into close contact with the disease. Children, however, are much more susceptible to infection But it is again *an evidence of the low infectivity of the disease that* NOT all the children who live in close contact with infective cases develop leprosy. Moreover, many of the children who show signs of leprosy do not pass into the more serious forms of the disease. In many *(the percentage may be as high as 60%), the disease either becomes aborted or the patch or other* signs of infection disappear. It is this tendency to self-healing that makes the course of the disease mild and benevolent in many cases, especially in children.

5. TODAY LEPROSY IS CURABLE. With adequate treatment, the large majority of cases can be enabled to lead *active lives in their normal surroundings and vocations. Early* treatment gives the greatest hope of recovery without scars.

6. LEPROSY DOES NOT KILL; NOR DOES IT DAMAGE THE BRAIN, HEART OR OTHER VITAL ORGANS.

7. Deformities in leprosy are largely the result of neglect and carelessness. *For the most part, they are preventable.* Even where they have already occurred, they can be corrected by *physiotherapy and surgery.*

8. BY PLANNED EFFORT WE CAN CONTROL LEPROSY AND ULTIMATELY *ERADICATE IT.*

HOW YOU CAN HELP.

There are several ways in which you can help.

1. BY SPREADING THE MESSAGE. Talk to people

about leprosy, try to wean them from prejudice and superstition convince them that they have a special duty towards their long-suffering brethren. Offer to talk on leprosy at social gatherings. Contribute articles dealing with some aspect of leprosy work to newspapers and magazines. Avoid the word 'leper'. Say instead 'a case of leprosy' or a 'leprosy patient'. Insist on others doing so.

2. BY *JOINING LEPROSY RELIEF ORGANIZATIONS*. Besides strengthening them, you will find opportunities of meeting workers in the field and helping schemes of leprosy control

3. BY GIFTS TO LEPROSY INSTITUTIONS. Food, clothes, books, amenities are needed by most leprosy hospitals. What may be of small value for you is likely to be precious to patients who lack these things.

4. BY WELFARE WORK PERTAINING TO LEPROSY. Earnest workers are the paramount need in any anti-leprosy campaign. Even if you can spare only an hour in the day or a day in the month, you can do much useful work for the cause, provided you are earnest about giving of your best in that 'part time' or 'spare time' work.

5. BY DONATIONS TO LEPROSY INSTITUTIONS OR ORGANISATIONS. each pie you give will help to transform despair into hope, disease into health, darkness into light.

TRENCHES ARE SHELTERS FROM AIR RAIDS

DON'T NEGLECT THEM
DON'T DEFECATE IN THEM
DON'T THROW RUBBISH IN THEM
DON' LET THEM BE FILLED UP
KEEP THEM CLEAN FOR EMERGEECY

Latest Trends in Modern Leprology.

As these pages were being completed the following interesting announcement appeared in the HINDU, December 18th 1962.

"It now seems probable that the Bacillus which is found in people who have Leprosy does not necessarily enter through the skin and destroy the nerves but may gain entrance through the Stomach and the Lungs and be carried to the sensory nerves' said Dr A. G. Weddell, Chief Neurologist of a team of Researchers and Reader in Human Anatomy of the Oxford University to a Press Conference at London.

Dr. Cochrane, one of "Britain's Leading Leprologists" (and an International Authority on the Subject, who needs no introduction to the readers in India) is reported to have told Reuters "the rsearch work had been conducted during the past seven years by Dr. Weddell." If Dr Weddell turns out to be right, it would mean that infection in Leprosy may be food-borne, water-borne and even air-borne. Such conceptions as Non-infective and Infective types, and theories such as long and prolonged intimate contact with lepromatous cases being necessary for Infection in Leprosy, must become defunct and obsolete.

What is the reaction of the Modern Leprologist to this new and latest announcement (London, Dec. 14th, 1962). "The whole programme of prevention will have to be altered if Dr. Weddell is right. He has shaken the very foundations of the principles for governing Leprosy and cast serious doubts on our theories" said Dr. R. G. Cochrane, reports REUTERS.

How does the "Rational Theory of the Evolution of Leprosy in man" proposed by the RATIONAL INTEGRATED LEPROLOGY (Part I) fare in the light of this new discovery : it stands unscathed. The following is its opening sentence : "It is clear herefore, that infection in Leprosy does not depend upon the

amount of the infection or the nature of the Infecting Donor's disease. It would seem to depend solely on the defences of the prospective recipient."

What happens to Indigenous Leprology in the wake of this discovery which " shakes the very foundations " of Modern Leprology? IT CALLS FOR NO CHANGE EITHER IN THEIR THEORIES OR THEIR METHODS OF DEALING WITH THE MANIFESTED DISEASE Indigenous Leprology was never ignorant of the bacterial causation of Leprosy .. only. IT IGNORED IT. One cannot control the movements of self-multiplying and ubiquitous bacteria nor attempt to control their modes of entry into the ambulatory human beings especially in diseases which continue in the Host-Donors for even decades before they succum to them. By the simple expedient of trying to raise man's resistance to the Bacteria, they seem to have attempted to overpower the bacteria the other way around, even from the earliest stages.

MUCH LATER ADVANCES YET TO COME IN MODERN LEPROLOGY may ultimately prove to us that the Ancient Authorities were much nearer the truth all the time, than we Modern Scientists have got to yet. The relevant question however is this :

DO WE WAIT FOR OTHERS TO PROVE IT TO US? Or DO WE GO RIGHT AHEAD AND TEST IT FOR OURSELVES?

Courtsey

"THE SECOND LINE OF DEFENCE"

Thought Provacation on Leprosy

Series No. II

by Francis A. CHIDAMBARAM.

Father Damien Foundation

Royapettah, Madras-14

When the Unexpected Happens ......

Accidents take place almost anywhere-in the home, on the road, in factory, Office or school. But they do not just happen by chance. They are the result of negligence on some body's part. They can be avoided by a little extra carefulness.

Our nation today is in a state of emergency with her freedom threatened by the Chinese invaders. There may be occasion in the future when we may have to face the menace of enemy attack. We should not be caught unawares in such a contingency but should prepare ourselves from now on as to what should be done in such a situation.

Civil defence measures are being taken in many parts of the country. These measures include training in first aid, rescue services, fire fighting, air raid precautions, etc. In emergencies with medical and hospital services reduced, citizens must rely on themselves caring for their own injuries and those of the others

We might face a surprise attack. When some unexpected like this happens one should not throw up one's hands in despair but do something which will help the injured persons to feel comfortable until the doctor arrives on the scene.

In such emergent situations you should know what should and what should not be done to the victim. This is what the following pages will say.

What is first aid?

First aid is the immediate and temporary care given to a victim of an accident or sudden illness until the services of a doctor can be obtained. Proper first aid preserves life, reduces suffering, makes the doctor's job easier and prevents the injury becoming worse, until the medical aid reaches the scene.

The responsibility of the first aider stops when that of the doctor's begins.

First aid is more than a dressing of an injury or a splint. It includes well selected word of enccuragement to the injured.

The need for first aid training is evident in day-to-day life. We see a cyclist being knocked down by a truck. Immediately, the truck driver picks up the cyclist and tries to put him in a car and rush him to the hospital. By improper handling, the injuries might become worse and his condition might get bad. So a first aider should know what to do and what not to do when an emergency occurs.

If you propose to give temporary care to a victim of an accident, take charge of him firmly but tactfully. If you know what to do and go about your work confidently, by-standers are less likely to interfere. The old saying, " too many cooks spoil the broth" applies well to accidents. If there are more than one person wanting to help the injured person, send other people to call the doctor or inform the victim's employer or home. (And be sure he gives the exact location)

The first aider should realise that be cannot replace the doctor,

The first aider should respond quickly to calls for assistance. The saving of life may depend on promptness of action.

First things first

First, get a claer picture of the sitution, the condition of the injured or sick person, the position in which he is found, the possibility of additional injury, and the exposure to cold or dampness.

Remember that what you do is only temporary and the help you give is chiefly to protect the injured until the medical aid arrives. Dressings must be simple and rapid. A doctor should not have to waste time removing elaborate bandages.

1. Keep the injured person lying down in a comfortable position—his head in level with his body until you know whether the injury is serious. This is a prevention against fainting and helps prevent " shock ".

2. Lock for serious bleeding. stoppage of breathing, wounds, burns, fractures and dislocations.

3. Attend to serious bleeding, stoppage of breathing, and poisoning first.

4. Keep the injured person warm. This is necessary to prevent serious shock. Do not apply external heat but maintain normal body temperature.

5. Send somone to call a doctor or an ambulance. The messenger should give the correct location of the jnjured, the nature and cause of the injury and the extent of the injury.

6. Do *not* move the injured unless it is absolutely necessary You should not move the injured untit you have a clear idea of the nature and extent of the injury.

7. Do not give water or other liquids if the injured person is unconscious. Water may enter the wind pipe and choke the person. If the injured is conscious and if there are no signs of abdominal injury give him water *but slowly and in sips*.

8. Keep the onlookers away from the injured as they often interfere with treatment. The injured also needs fresh air.

9. Do not let the patient see his own injury. But reassure him to lesson anxiety.

SHOCK

Shock is a condition which follows all serious injuries. It may be only faintness or severe collapse This traumatic shock-- different from electric shock, shell shock, etc., is caused by loss of large quantities of blood either externally or internally.

Signs of shock include: the skin is pale, cold and moist the eyes are vacant and pupils *dilated, the pulse may be weak and rapid*; breathing may be irregular; nausea and vomiting may follow.

What to do

Shock is easier to be prevented than cured

1. Keep the patient lying down with his feet raised slightly. This helps the flow of blood to the head and chest where it is needed more.

2. Do not raise the feet if there is head injury, breathing difficulty and when patient complains of pain when the feet are raised.

3. Keep the patient warm. Wrap in a blanket or rug. Do not apply heat like hot water bottle.

4. Do not give any liquid if the victim is unconscious. If conscious, give him sips of water or hot tea.

5. Do not move the patient because shock may be made worse, Movement might increase bleeding.

6. Attend to bleeding first and stop the flow of blood by placing a sterile gauze or clean handkerchief on the wound and press it firmly.

7. Call for medical aid immediately.

BLEEDING

Bleeding can be severe as well as slight, depending on the nature of the wound. A wound is a break in the skin.

Keep the patient lying down.

If there is profuse or excess of bleeding stop the flow of blood immediately by applying pressure directly over the wound with a sterile gauze or clean cloth or your hand.

If the bleeding is not severe, cover the wound with sterile gauze.

Do not attempt to clean the wound or apply antiseptic.

BURNS

Your aim in attending to a victim of burns is to relieve pain, prevent infection and prevent shock.

If burns are slight and the skin is not broken, you can apply any clean ointment to relieve discomfort. Cover the wound with a sterile gauze or a clean handkerchief.

If the burn is *deep and the* skin broken, make the victim lie down.

Protect him against cold. Keep the victim warm *and give him sips of hot tea or water.*

Send for the doctor or an ambulance.

Cover the wound with clean cloth. If blisters are present apply bandage lightly and do not break the blisters.

FRACTURE.

A fracture is a break or a crack in a bone. If there is wound leading to the *broken bone, it is called* open or compound fracture, if there is no wound leading to the fracture, it is called closed or simple fracture.

You should be *very careful in examining for* a broken bone. Unskilled handling will make the condition worse. In looking for a broken bone compare the injured limb with an uninjured one.

Some Symptoms.

(i) *Pain at or near the seat of fracture.*

(ii) The injured part cannot be moved freely.

(iii) The injured limb may assume unnatural position.

(iv) Unnatural movement at the place of fracture.

What to do

Make the victim comfortable.

Do not move the injured limb.

If the injured person should be carried from the scene, a splint must be applied before he is moved. (Splint is any appliance that will hold the injured limb straight).

Stop bleeding, *if any, immediately*.

If it appears as though the back bone is injured, the patient should not be moved. *Immediate* medical aid must be asked for.

From : C. H E. B.

LEARN FIRST AID

SOMEBODY, SOMEWHERE MAY NEED YOUR HELP.

IF YOU ARE A FIRST AIDER, YOU CAN SAVE LIFE,

REDUCE SUFFERING AND PREVENT INJURIES FROM BECOMING WORSE

WHY NOT JOIN FIRST AID CLASS TODAY

Treatment of Sewage from The Government Tuberculosis Sanatorium at Tambaram in an Oxidation Pond.

(K. G. VEERARAGHAVAN, B.A., M.Sc. *)

It is common practice in India, in rural areas particularly to let waste water from houses into open land to form a pond or lagoon there. Scientific studies made in recent years have shown that this method, if properly controlled and regulated can bring about satisfactory purification of domestic sewage and is therefore suitable for use in places where land is no problem and a favourable climate prevails. These "oxidation ponds" or "Stabilization ponds" are so named on account of the nature of the Predominantly natural processes of purification which is allowed to take place in the ponds. This system is in use now in various parts of the United States of America such as Texas, Colarado, Missouri, the Dakotas, and Wyoming. In Texas alone, it is stated that 189 cities have adopted this method.

This artificial pond is usually located at some distance (about 0.4 km away) from the residential area ; it has a flat and fairly impervious bottom and a depth of 0.75 to 1.2 metres. If it is very shallow, larger aquatic weeds will grow and allow mosquitoes to breed in it. If it is too deep, efficient purification of the sewage may not take place. Ordinarily, the pond is of sufficient size to hold the sewage let into it for about 20 to 30 days. Well-managed oxidation ponds, it is stated, are free from bad odours and purify the sewage almost to the same degree as the more elaborate methods like the Activated sludge process.

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* Chief Water Analyst, Department of Water and Sewage Examination, King Insititute, Guindy, Madras-32.

The natural processes which bring about purification of the sewage in the oxidation pond are quite complicated. Basically, they depend on the activity of the numerous bacterial and other microorganisms present in the sewage, which utilize the complex organic compounds in the sewage as food, and in so doing break down these compounds into simpler, innocuous chemical substances. These organisms require oxygen for their life-activities. But usually sewage is almost totally devoid of dissolved oxygen. However, during the period of stay of the sewage in the open oxidation pond, a very rich growth of chlorophyll-containing plant organisms (algae) occurs. These algae are capable of assimilating carbon dioxide and water with the aid of the energy drawn from sunlight to form carbohydrates. In this process of " Photosynthesis ", a large amount of oxygen is released which goes into solution in the water and which is utilized by the bacterial and other organisms for breaking down the complex organic campounds. These, in turn, serve as food material for the growth and multiplication of the algae. Thus by the respective life processes proceeding apace, the obnoxious organic materials in sewage are decomposed and stabilised and the effluent from the pond is rendered suitable for irrigation or for being discharged into natural water-courses.

Researches are also under way to find economic uses for the algae grown in the oxidation ponds and to devise suitable methods for managing the pond so as to provide the most useful balance of activity between the bacterial and the algal organisms.

This cheap system of sewage purification and disposal is gaining favour for adoption in Madras State also. Sewage oxidation ponds have been provided for treating the sewage from small colonies, such as the Madras Housing Unit Colonies at Nandanam and the San Thome Foreshore. An oxidation pond has recently been put into commission at the Indian Institute of Technology at Guindy. Part of the Madras City sewage is now taken to Kodingayur and treated in oxidation ponds before it is let into a grass farm.

Crude untreated sewage, besides being unaesthetic in appearance, odour etc., is a source of potential risk to the

health of the people. Sewage from hospitals presents a much greater risk and the question of purifying and rendering it harmless before it is disposed off has been engaging the attention of The Water and Sewage Purification Committee of the Government of Madras for sometime now. The wastes from most hospitals located in places where there is no municipal sewage system, are treated in a septic tank and disposed off either by soil percolation or let into the town drains.

The sewage from the Tuberculosis Sanatorium at Tambaram is also treated in a septic tank; but provision has also been made to further purify the septic tank effluent in an oxidation pond before it is allowed to flow along a natural drainage course into an open terrain at some distance.

In the case of Tuberculos Sanatoria, there is the special risk that tuberculosis bacteria which may be excreted in the faeces of the patients, and also in their sputum while the patients use the lavatories, will find their way into the sewage; these bacteria are known to be fairly resistant and able to survive the usual sewage treatment processes like biological filtration. activated sludge treatment and septic tank treatment. They also resist fairly high doses of disinfectants such as chlorine An investigation is therefore, being carried out at the Water and Sewage Examination Laboratories of the Public Health Department, King Institute, Guindy to ascertain the extent of purification effected by the oxidation pond at Tambaram Tuberculosis Sanatorium, especially the effect of such treatment on the tuberculosis bacteria. The results of the preliminary experiments are given in this note.

The total daily discharge of sewage from the 58 latrine seats in this Sanatorium is approximately 90,000 litres, which flows into a septic tank and thence into the oxidation pond. This pond is rectangular in shape (160 feet x 110 feet) with an average depth of 3 feet. The bottom soil is of gravelly red earth. The effluent from the oxidation pond flows along a narrow channel and finally joins a wayside drain.

The above investigations were started in February 1962 and

samples of raw sewage, the effluent from the septic tank, and the effluent from the oxidation pond were collected at frequent intervals and tested for their physical, chemical and bacteriological characteristics. The examination of every sample included a special search for the presence of bacteria of the group to which the tuberculosis organism (the acid-fast Mycobacteria) belongs. Attempts are also made to grow the bacteria present in the samples and carry out specific tests which would show their pathogenic or harmful nature.

The results obtained so far in these investigations are summarized below :—

Table-I : Showing results of tests on samples of raw and treated sewage from the Tuberculosis Sanatorium, Tambaram.

		Raw sewage	Septic tank effluent	Oxidation pond effluent
Physical appearance.		Pale brown to whitish	Black to slightly whitish	Greenish
Smell.		Phenolic	Rotten eggs	Algal
Suspended solids (mg/1)	Maximum	350.0	150.0	280.0
	Minimum	40.0	50.0	40.0
	Average	146.0	89.0	138.0
Biochemical oxygen demand (mg/1)	Maximum	230.0	180.0	30.0
	Minimum	130.0	96.0	3.5
	Average	177.2	132.9	13.3
Dissolved oxygen (mg/1)	Maximum	1 6	nil	9.2
	Minimum	nil	nil	1.3
	Average	0.5	nil	4.5
Total nitrogen (mg/1)	Maximum	53.2	53.2	35 0
	Minimum	12.6	35.0	18.2
	Average	34.4	42.1	27.8
Organic nitrogen (mg/1)	Maximum	26.4	26.8	20.8
	Minimum	4.2	7.2	5.6
	Average	14.6	14.0	13.4

It will be seen that the raw sewage is discoloured and has a phenolic smell. Judged by the usual criteria, it may be classed as of average to moderately low strength. The effluent from the septic tank is foul-smelling, and shows some improvement as compared with the raw sewage as regards its chemical features. The effluent from the oxidation pond is greenish in colour and shows a significant reduction in its organic matter content as judged by the Biochemical Oxygen Demand (B.O.D.) test. This effluent was fairly rich in dissolved oxygen and the smell was more of an organic than an offensive nature. A luxurious growth of algae was present in the pond water which contributed to the oxygenation in the pond. The predominant algae were of the green variety viz., *Plandorina, Eudorina, Pleodorina, Scenedesmus, Pinnularia.* and unicellular chlorella-like organisms. A small number of blue green algae, mainly *Oscillatoria* were also present.

A special technique was employed for concentrating the bacterial organisms in the samples and examining the concentrate for the presence of acid-fast Mycobacteriae. Samples of the raw sewage showed their presence on five out of ten occasions. Four of the ten samples of the effluent from the septic tank also showed large numbers of acid-fast bacilli. They were however, consistently absent in all the samples of the effluent from the oxidation pond. This finding is of particular significance because in the case of the sewage from a T. B. Sanatorium, the acid-fast bacilli present are very likely to be the *Mycobacteriae tuberculosis;* so it is essential that these should be destroyed or removed before the sewage is allowed on land or into water-courses in order to safeguard public health. The tests carried out so far would appear to justify the conclusion that purification in the oxidation pond may be satisfactory for the purpose. Further studies to confirm the above findings are in progress.

Reconstrutive Surgery

IN

Leprosy Rehabilitation

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Christian Medical College Hospital,

Vellore, India

The past 15 years have seen big changes in our attitude to Leprosy Rehabilitation This is partly due to the introduction of effective remedies. It is also due to the fact that reconstructive surgical techniques have proved successful in the correction of leprosy deformities. Much progress has also been made in our knowledge of how to prevent secondary *deformities* (that is those not due primarily to leprosy) such as trophic ulceration of feet and absorption of fingers. Because of all these discoveries we find ourselves on the fringe of a vast new field of rehabilitation. In the past little could be done so the problem did not seem a pressing one. Now that rehabilitation—restoration to dignity and independence—is an attainable goal for the leprosy patient it has become one of the most urgent questions of our day. The peculiar difficulties that confront us in such a campaign have been analysed by Dr. Brand. The deep-rooted *fear* of leprosy is one. Deformity spells infection to the public even though the diesease has passed. Another is the *ugliness* which is caused by the disease and makes acceptance in society an acute problem. Then again the end-results of nerve paralysis are severe *disability* at work and the constant *danger* of damage to anaesthetic extremities. Finally there are the *psychological* repurcussions in the minds of the patients leading to bitterness and apathy.

A Revolution is taking place in Leprosy Treatment Reconstructive Surgery is a source of great hope to those unfortunate patients who have suffered disfigurement these striking pictures on the following pages of patients before and after operation are a proof of that revolution.

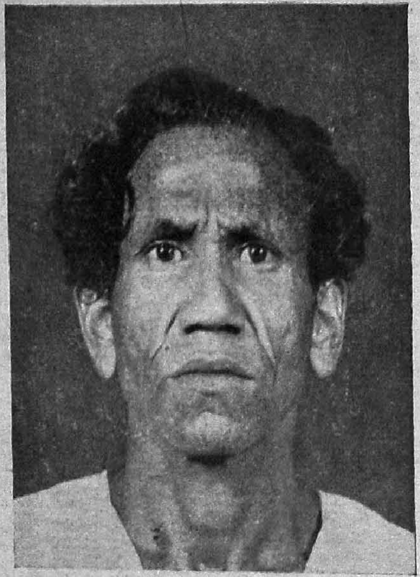

Fig. 1
Face Lift Pre-Operative.

Fig. 2
Face Lift Post-Operative.

The magnitude of the task is seen to be overwhelming when one considers the number of physicians, surgeons, nurses, physiotherapists, occupational therapists, rehabilitation officers etc. etc. all of them requiring training in leprosy rehabilitation, that would be needed for the basic machinery in the rehabilitation of millions of leprosy patients. When one turns from the enormity of the problem considered as a whole to the pilot projects which have already been started the conviction grows that step by step the impossible shall be done!

As a result of the poineering work of Dr. Brand a pattern of Leprosy Rehabilitation has been emerging during the past decade or so at the Christian Medical College Hospital, Vellore. Perhaps the most outstanding features of this pattern is the integration of the programme with the treatment and rehabilitation of other diseases. In the Rehabilitation Wing, Orthopaedic patients, Physical Medicine patients, and Leprosy patients mix freely in the wards. To create confidence and to take away any ground for fear there is a small ward in the same wing in which *infectious patients are hospitalized separately; non-leprosy* patients are not admitted into this ward.

Leprosy patients are admitted into this wing for reconstructive surgery of a wide variety of deformities. These encroach on the specialities of the Orthopaedic surgeon, the Plastic surgeon, the Hand surgeon and the Ophthalmologist. Specialists in these fields have been giving instruction and demonstration to the surgical trainees. The following are some of the operations carried out in restoring de formed faces, hands and feet to normal or near-normal appearance and function. Reconstruction of the face (Fig. I and II) includes an operation for face-lift when sagging and wrinkling of the skin in a lepromatous boy for instance have made it necessary to restore youth to the young! Replacement of eyebrows may be performed (Fig. III and IV) using an island pedicle graft. Scalp the size of the desired eyebrow is transferred in continuity with a branch of the superficial temporal artery. Collapse of the nose, a common cause of the ugliness already to, may be completely corrected by a two stage procedure (Figure V and VI). A postnasal epithelial inlay of split skin restores the lining of the nose

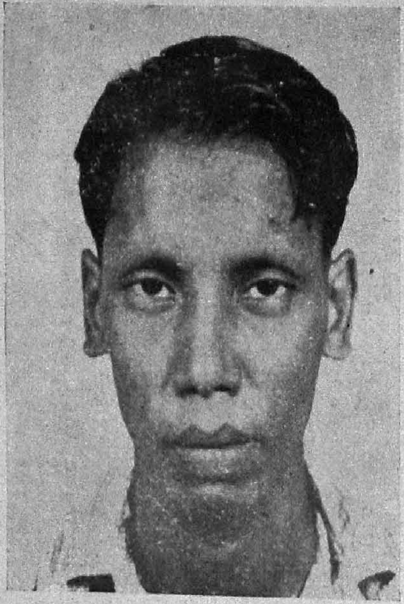

Fig. 3
Eye Brow Replacement
Pre-Operative.

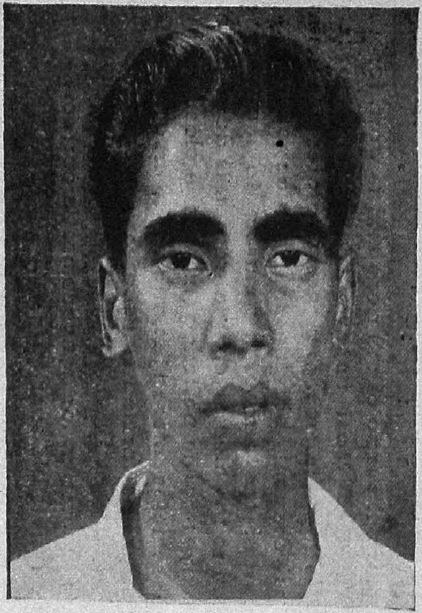

Fig. 4
Eye Brow Replacement
Post-Operative.

when the latter has been freed from its posterior fibrotic attachments. A removable mould is inserted for 4–6 *months. Then if* desired bone grafts may be inserted as a second stage for support of the nose. Otherwise a removable prosthesis is inserted which maintains the normal shape of the nose and is worn for the rest of the patient's life. Most important of all in the face are operations for lagophthalmos, designed to protect the insensitive eye and thus prevent blindness from exposure keratitis. Transfer of part of the temporalis muscle to motivate fascial slings tunnelled to the medial canthal region is done to provide closure of the eyes. The patient gains active closure of the eye and the eye remains closed at night. Tarsorrhaphies and cantho plasties are performed as necessary in selected cases.

Webster's Operation for *gynaecomastia corrects* this deformity leaving on invisible scar.

The pattern of peripheral nerve paralysis in leprosy lends itself to the standardisation of reconstructive techniques. The usual pattern of paralysis in the hand is median nerve at the wrist, ulnar nerve at the elbow. Paralysis of the radial or median nerves in the arm is rare.

The operation commonly employed for correction of clawing of the fingers (Figures VII and VIII) is Brand's Many–tailed graft. In this, use is made of the unparalysed radial nerve supplied muscles by taking one of the three active wrist extensors. Usually the extensor carpiradialis longus is taken and a graft of plantaris tendon from the leg or fascia lata from the thigh is anastomosed to its cut end. The graft is then split into 4 tails and each tunnelled separately to each finger to provide flexion at the first knuckle. The principle of restoring active flexion in the matacarpo-phalangeal joints of the fingers is fundamental to correcting clawing whatever operation is chosen. The middle joints are automatically straightened by the active extensor muscle when the m. p. joints are stabilized by the transfer.

For severely contracted i. p. joints anterior skin grafting followed at a later stage by arthrodesis in an almost straight

Fig. 5
Rhinoplasty—Pre-Operative.

Fig. 6
Rhinoplasty—Post-Operative

position gives a finger satisfactory appearance and function; the latter is gained by compensatorp hyper flexion of the m. p. joint which enable the fingers to reach the palm.

Clawing of the thumb is corrected by transfer of the flexor digitorum sublimis from the ring finger (Figures IX and X). It is drawn out in the forearm, tunnelled along the ulnar nerve canal to the pisiform bone and then routed across the base to the palm to the thumb where the two slips are inserted separately. In this way a thumb lying useless beside the palm may be activated and made useful in picking up small objects and grasping larger ones. Posterior skin grafting of contracted thumb webs is essential in certain cases and should be performed at the same operation.

Arthrodesis of the metacarpophalangeal joint of the thumb is frequently necessary when instability is present in this joint. It results in a stable functionally useful thumb which has a good appearance.

Wrist drop can be corrected by tendon transfer.

In the foot, lateral popliteal paralysis leads to foot drop and is corrected by transfer of the tibialis posterior muscle to act as an ankle dorsiflexor. It may be routed either circumtibially or through the interosseous space.

Claw toes are corrected by tendon transfer when mobile and interphalangeal arthrodesis when the clawing is fixed.

Tripple arthrodesis performed for the fixed inversion deformity which occures in leprosy brings the whole weight bearing surface of the foot into contact with the ground and thus lessens the tendency to lateral border ulceration.

The reconstructive surgery programme depends for its success on the existance for an efficient physiotheraphy unit working in the closest co-operation with the surgeons. In addition to a detailed programme of pre-operative and post-operative treatment. no operation is undertaken without consultation with the physiotheraphy team and repeated consultations are held during the post-operative re-education period.

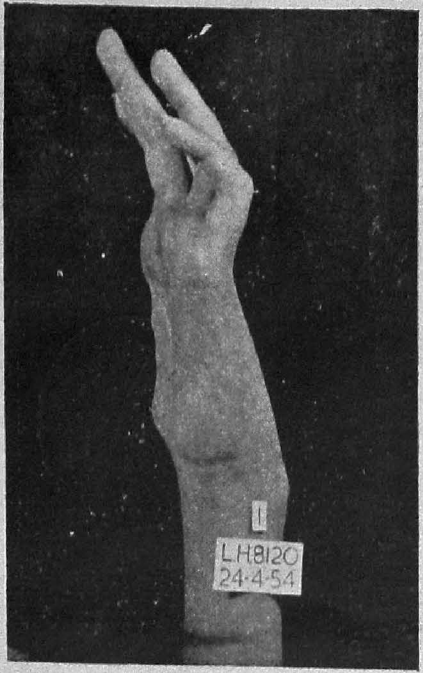

Fig. 7
Clawing of Fingers
Pre-Operative.

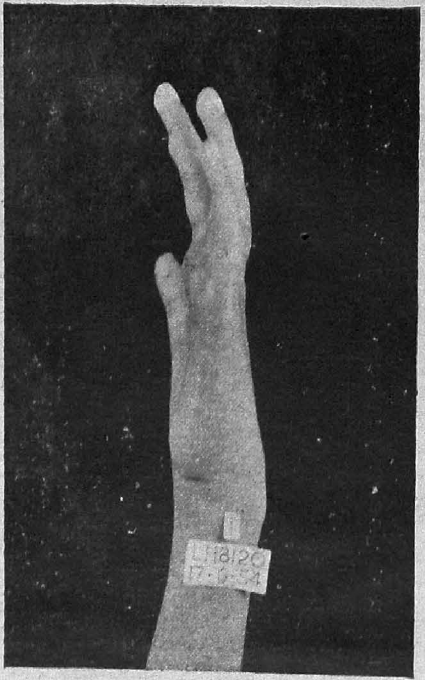

Fig 8
Clawing of Fingers
Post-Operative.

The pattern of surgical rehabilitation in leprosy would be incomplete indeed without a scheme for Re-education in the use of re-constructed but still anaesthetic hands. Vocational training makes functionally restored hands into skilful ones.

A re-education project in a situation near to the Medical College provides facilities for short term education in the care of hands and feet, longer term training in an occupation, and sheltered industry employment for others.

The establishment in June 1956 of a Leprosy Research Sanatorium a few miles from the Hospital is another important feature in the overall pattern. Here vital contributions are being made to our understanding of the aetio pathology, clinical course, and treatment of primary and secondary leprosy deformities.

Thus in these ways the pattern has become known. Leprosy patients are brought to the doorstep of the medical profession and of the public. Patients are seen happy and getting rehabilitated. Doctors and others move amongst them *without fear*. One by one the *ugly and disfiguring features are being removed*. The *disabilities are being corrected* and *training given to avoid the danger* of anaesthetic extremities. With coming of restored dignity and independence *psychological problems are solved.*

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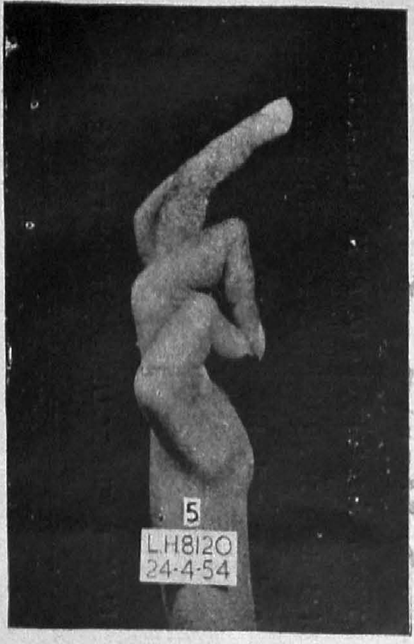

Fig. 9
Paralysis of Thumb Pre-Operative.

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Fig. 10
Paralysis of Thumb Post Operative.

IN MEMORIUM

Dr. R. ADISESHAN

Born on : December 1889

Expired on : 7th August '62

He joined Madras Government service as a Civil Assistant Surgeon in 1915. After serving as Assistant Director of Public Health for 20 years, became Director of Public Health in 1941 and retired in 1944.

Dr. T. S. ADHISUBRAMANIAM

Born on : 15th March 1902

Expired on 3rd March 1963

He joined this Department as Municipal Health Officer in 1927. Served as A.D.P.H. and Professor of Hygiene from 1951 to 1954. Became D. P. H in 1954 and served till retirement in 1957.

MAY THEIR SOULS REST IN PEACE.